KOBZEV, V.V.; MILINKIS, B.M.; YEMEL'YANOV, R.G.; VEYTSMAN, G.I.,
red.

[Use of lasers for communication purposes] Primenenie opticheskikh kvantovykh generatorov dlia tselei sviazi. Moskva, Sviaz', 1965. 119 p. (MIRA 18:12)

L 25650-66 FBD/EWT(1)/EEC(k)-2/T/EWP(k)/EWA(b) IJP(c) GG

ACC NR: AM6015021 Monograph UR/ 12 B+1

Kobzev, V. V.; Milinkis, B. M.; YEmel'yanov, R. G.

Laser applications in communications^{25} (Primeneniye opticheskikh kvantovykh generatorov dlya tseley svyazi) Moscow, Izd-vo "Svyaz'", 1965. 119 p. illus., biblio. 10,000 copies printed. (At head of title: Ministerstvo svyazi Soyuza SSR. Tekhnicheskoye upravleniye) Series note: Lektsii po tekhnike svyazi

TOPIC TAGS: laser, laser application, laser design, radiation, communication system, quantum generator

PURPOSE AND COVERAGE: This book is intended for radio and communication specialists and students of schools of higher education and tekhnikums concerned with the operation of lasers and their application to the field of communication. The authors made an attempt to summarize information on lasers and to explain the possibility of using lasers in communication.

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SUB CODE: 20/ SUBM DATE: 22Sep65/ ORIG REF: 042/ OTH REF: 060

Card 3/3 fv/

YEMEL'YANOV, S.

Seminar of Central Asian school personnel. Prof.-tekh.obr. 18 no.6:13 Je '61. (MIRA 14:7)
(Soviet Central Asia—Farm mechanization)
(Soviet Central Asia—Vocational education)

YEMEL'YANOV, S.; RASHCHINSKIY, M.; starshiy inzhener-metodist.

Let's raise the teaching of the political sciences to the level of the present-day requirements. Prof.-tekh. obr. 17 no. 11:19-21 N '60. (MIRA 13:12)

1. Zaveduyushchiy laboratoriyey vospitatel'noy raboty TSentral'nogo uchebnometodicheskogo kabineta professional'no-tekhnicheskikh uchilishch (for Yemel'yanov).
(Social sciences--Study and teaching)

YEMEL'YANOV, S.

There is need for a creative approach. Prof.-tekh. obr. 21 no.6:5-6 Je '64. (MIRA 17:9)

PEREKAL'SKIY, N.P., doktor tekhn.nauk; YEMEL'YANOV, S.I., inzh.

Electrostatic device for the continuous measurement of stock concentration in the production lines of woodpulp and paper industries. Trudy LTITSBP no.11:203-205 '62. (MIRA 16:10)

L

USSR/ Agriculture - Exhibitions

Card 1/1 Pub. 123 - 5/17

Authors : Emel'yanov, S., Director of the "livestock" pavilion

Title : The "livestock" pavilion

Periodical : Vest. AN Kaz. SSR, 11, 38-43, Nov 1954

Abstract : It is pointed out that the application of scientific methods to livestock raising contributed in increasing the quantity and quality of livestock at collective and Soviet farms (Kolkhoses and Sovkhoses) of the Kaz. SSR. The results of such a program were shown at the All-Union Agricultural Exhibition which is described. Tables.

Institution : .....

Submitted : .....

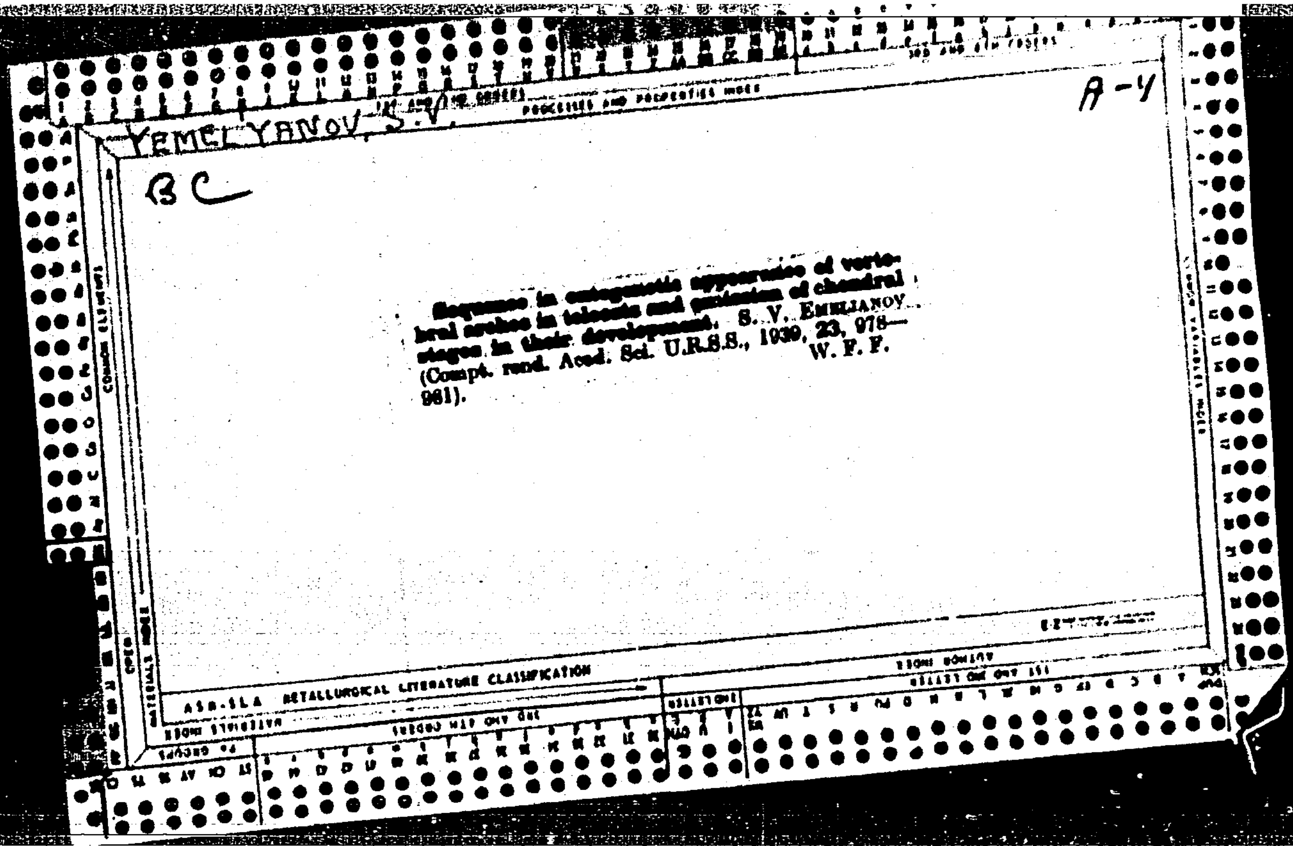
BUSURIN, Ya.A., redaktor; YEMEL'YANOV, S.L., redaktor; YESAULOV, P.A.,
redaktor;KRYLOV,G.A., redaktor; LITOVCHENKO, G.P., redaktor;
SOROKIN, A.M., redaktor; KLETCHENKO, A.V., redaktor; ROMANOVICH,
Ye.F., redaktor; SUCHIK, Ye.V., redaktor; PAVLOVA, M.M., tekhnicheskiy redaktor

[For highly productive sheep breeding; materials of the All-Union Conference on Sheep Breeding, held in the Great Kremlin Palace in Moscow, November 14-18, 1955] Za vysokoproduktivnoe ovtsevodstvo; materialy Vsesoiuznogo soveshchaniia po ovtsevodstvu, proiskhodivshego v Moskve, v Bol'shom Kremlevskom dvortse 14-18 noiabria 1955 g. Moskva, Gos. izd-vo selkhoz. lit-ry, 1956. 418 p. (MLRA 9:10)

1. Vsesoyuznoye soveshchaniye po ovtsevodstvu, Moscow, 1955. 2. Chlen kolegii Ministerstva sel'skogo khozyaystva SSSR (for Yesaulov).
(Sheep breeding--Congresses)

ZHARKOVSKIY, D.V. [Zharkovski, D.V.]; YEMEL'YANOV, S.M. [Emial'inau, S.M.]

Wetting of cellulose with liquids. Vestsi AN BSSR Ser. fiz. tekh. nav. no.1:61-64 '64 (MIRA 17:7)



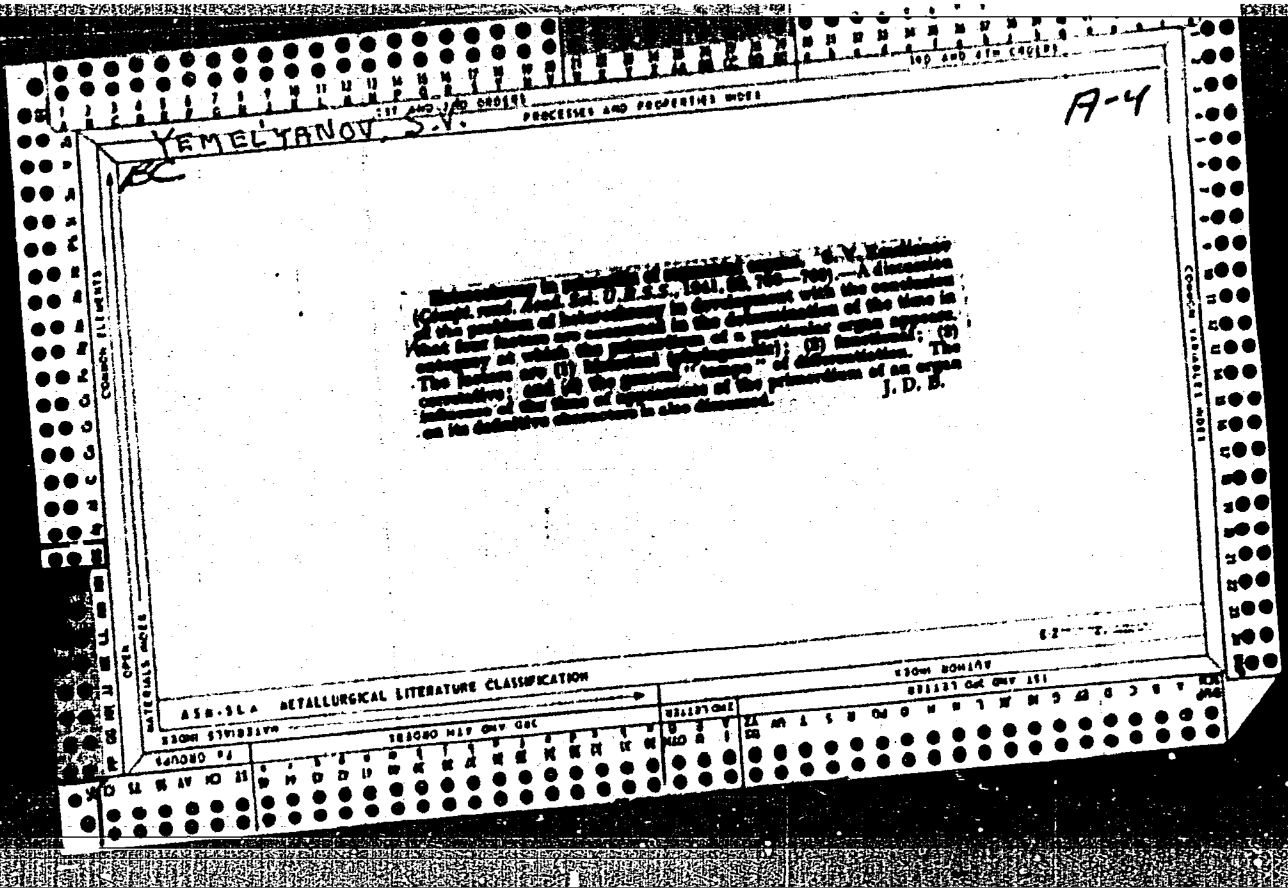
YEMEL'YANOV, S.V.

A-4

BC

Sequence in ontogenetic appearance of vertebral arches in teleosts and [illegible] of chondral stages in their development. S. V. EMELJANOV (Compt. rend. Acad. Sci. U.R.S.S., 1939, 23, 978—981). W. F. F.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



YEMELYANOV, S.V.

BC

A-4

PROCESSES AND PROPERTIES INDEX

[illegible] of [illegible] organs. S. V. Emelianov (Compt. rend. Acad. Sci. U.R.S.S., 1941, 31, 785—790).—A discussion of the problem of heterochrony in development with the conclusion that four factors are concerned in the determination of the time in ontogeny at which the primordium of a particular organ appears. The factors are (1) historical (phylogenetic); (2) functional; (3) correlative; and (4) the general "tempo" of differentiation. The influence of the time of appearance of the primordium of an organ on its definitive characters is also discussed.

J. D. B.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

YEMEL'YANOV, S.V.

Injuries to pectoral fins of the sturgeon under conditions of artificial propagation and the effect of these injuries on the viability of the young. Trudy Inst.morf.zhiv. no.5:147-155 '51. (MLRA 6:9)
(Sturgeons)

YEMEL'YANOV, S.V.

CTRSPL Vol. 5-No. 1 Jan. 1952

Emel'yanov, S.V. (A.N. Severtsov Institute of Animal Morphology, U.S.S.R. Academy of Sciences). The effect of the washing off of sturgeon roe on the development of the young. 371-4

Akademiya Nauk, S.S.S R., Doklady Vol. 78, No. 2, 1951

YEMEL'YANOV, S.V.

OTRSPL **No. 45**

Emel'yanov, S.V. (A.N. Severtsov Institute of Animal Morphology, U.S.S.R. Academy of Sciences). The influence of washing sturgeon roe and incubation in the ses-green apparatus on the development of the olfactory organ. 1045-7

Akademiya Nauk S.S.S.R., **Doklady** **Vol. 79** **No.** 6, 1951

YEMEL'YANOV S.V.

USSR/Farm Animals. General Problems Q-1

Abs Jour : Ref Zhur - Biol., No 8, 1958, No 35587

Author : Yemel'yanov S.V.
Inst : Not Given
Title : The Doctrine of I.V. Michurin and the Management of the Development of Animals (Ucheniye I.V. Michurina i upravleniye razvitiyem zhivotnykh)

Orig Pub : Vestn. AN SSSR, 1955, No10, 16-21

Abstract : The author applies the principles advocated by Michurin, for the management of the development of plants, to animal organisms. The need for the study of the mechanism of the individual development of animals and the influence of changed conditions of development, at different stages, on various species and breeds of animals is pointed out.

Card : 1/1

YEMEL'YANOV, S.V., doktor biologicheskikh nauk.

The teachings of I.V.Michurin and the control of animal development.
(MIRA 9:1)
Vest. AN SSSR 25 no.10:3-15 O '55
(Adaptation (Biology))

YEMEL'YANOV, S.V.

YEMEL'YANOV, S.V., doktor biologicheskikh nauk.

Problem of the individual development of farm animals; conference in Kiev. Vest.AN SSSR 26 no.8:115-119 Ag '56. (MLRA 9:9)
(Morphology (Animals))

B

USSR / General Biology. Individual Development.

Abs Jour : Ref Zhur - Biol., No 19, 1958, No 85581

Author : Yemel'yanov, S. V.
Inst : Not given
Title : Reactions of Animals to External Influences at Various Periods in their Development (On the Problem of Development Management in Breeding Animals).

Orig Pub : Zool. zh., 1957, 36, No. 1, 49-63

Abstract : At various periods of their development animals react differently to external influences. The earlier the influence begins, the more general is the character of changes. As the development proceeds, the results of the influence become more and more selective and specific. The earlier

Inst. Animal Morphology, im A N Severstov,

Card 1/4

19 AS USSR

B

USSR / General Biology. Individual Development.

Abs Jour : Ref Zhur - Biol., No 19, 1958, No 85581

the influence begins the greater the results may become. In order to bring about specific changes in the total organization of the animal or its individual organs, they should be influenced at a definite period in their development. The visible results of influences do not become manifest at the moment. Changes which do occur in the developing organism are irreversible; influences at later stages of development can only partially remove effects of earlier influences. Therefore, in animal breeding, one cannot delimit oneself by influencing them in one particular period of life, but a guided breeding of the animal is necessary during the total course of its development. The basic rules of reaction to external influences are the same in animals and

USSR / General Biology. Individual Development. B

Abs Jour : Ref Zhur - Biol., No 19, 1958, No 85581

plants. The Michurin studies of different plasticity of the organism at various priods of its ontogenesis and of the fact that an adult organism at various periods of its ontogenesis and of the fact that an adult organism changes as a result of influences on the course of its development, is applicable also to animals. In the theory of phyloembryogenesis Severtsov also asserted that "evolutionary changes consist of changes in the course of ontogenetic development" and that these changes can be generated in animals at any stage of development all the way to adulthood, but with age the possibility of changes gradually diminishes. Among zoologists, these positions did not acquire generl recognition, since frequently points of view are expressed close

Card 3/4

USSR / General Biology. Individual Development. B

Abs Jour : Ref Zhur - Biol., No 19, 1958, No 85531

to those of Haeckel, who asserted that new features are acquired at the adult or near-adult stage, when organs are formed and perform a definite function. The correctness of Severtsov's and Michurin's concept is affirmed in the practice of husbandry, where it is generally recognized that a poorly bred young animal never becomes one of high quality. In practice it is confirmed that an animal organism changes in the course of its general development as influenced by the environment, and that these changes are manifested at its later stages of development. Bibl. 56 refs. --- L.V. Danilova.

Card 4/4

YEMELYANOV, S. V. (Moscow) Institute of Animal Morphology, USSR Academy of Sciences

"Heterochronies in the Appearance of the Anlage of Organs of Vertebrates and their Role in the Process of Evolution"

Soviet paper presented at 15th Intl. Congress of Zoology, London, 16-23 Jul 58

YEMEL'YANOV, S.V.

Conference on the development and expansion of morphological research
Izv.AN SSSR.Ser.biol.no.4:498-502 Jl-Ag '58 (MIRA 11:8)
(MORPHOLOGY (ANIMALS)--RESEARCH))

YEMEL'YANOV, S.V.

Effect of the state of egg membrane (glutinous and deglutinated) on the course of embryonic development in the sturgeons Acipenser güldenstädti and A.stellatus. Trudy Inst. morf. zhiv. no.37:67-219 '61. (MIRA 14:10)

(FISH CULTURE) (STURGEONS)

YEMEL'YANOV, S.V.

Heterochronies in the setting of organs in vertebrates. Trudy Inst. morf. zhiv. no.38:17-76 '63. (MIRA 16:10)

YEMEL'YANOV, Sergey V.

Variability of larvae of fishes hatching from eggs of one female.

Report to be submitted for the 16th International Zoology Congress
Washington, D.C., 20-27 Aug 63

BORSUK, R.A., red. (Moskva); BOCHAROV, Yu.S., red.(Moskva);
GINZBURG, A.S., red.; YEMEL'YANOV, S.V., red.; LANGE,
A.B., red.; LARIONOV, V.F., red.; MANUILOVA, N.A., red.;
MATVEYEV, B.S., red.; PODDUBNAYA-ARNOL'DI, V.A., red.;
POTEMKINA, D.A., red.; TRANKOVSKIY, D.A., red.; USTINOVA,
Ye.I., red.; SHMIDT, G.A., red.; SHREDER, V.N., red.;
NECHAYEVA, Ye.G., red.

[Problems in modern embryology] Problemy sovremennoi embriologii. Moskva, Izd-vo Mosk. univ., 1964. 565 p.
(MIRA 17:5)

L 46028-66 EWT(d)/EWP(v)/EWP(k)/EWP(h)/EWP(1) GD/BC

ACC NR: AT6017612 (N) SOURCE CODE: UR/0000/65/000/000/0126/0136

AUTHOR: Yemel'yanov, S. V.; Bermant, M. A.; Utkin, V. I.

54
B+1

ORG: none

14

TITLE: Construction of automatic control systems with variable structure and low sensitivity to rapid changes in a wide range of parameters of the controlled object

SOURCE: Vsesoyuznaya konferentsiya po teorii i praktike samonastraivayushchikhsya sistem. 1st, 1963. Samonastraivayushchiyesya sistemy (Adaptive control systems); trudy konferentsii. Moscow, Izd-vo Nauka, 1965, 126-136

TOPIC TAGS: nonlinear automatic control, automatic control parameter, LINEAR AUTOMATIC CONTROL SYSTEM

ABSTRACT: The paper proposes a direct method of calculating the control law of linear, second and third order control systems with variable parameters so that the dynamic properties of the systems remain unchanged. The transient response time is used as one of the system's dynamic criterions. The basic idea of the method is to find a subspace in the admissible state space of the system, such that the movement in it is independent of changes in the object parameters. By assuring that the system is stable in that subspace, and that for any initial state the system will get into that subspace, the problem would be solved. A direct solution, based on a controller with a variable structure is proposed. General formulas are derived and three examples are presented. Orig. art. has: 9 figures, 32 formulas.

SUB CODE: 13,12/ SUBM DATE: 22Nov65/ ORIG REF: 011

Card 1/1

ACC NR: AP6034566 SOURCE CODE: UR/0020/66/170/006/1279/1282

AUTHOR: Petrov, B. N. (Academician); Yemel'yanov, S. V.; Dubrovskiy, Ye. N.; Kortnev, A. V.

ORG: Institute of Automation and Telemechanics, AN SSSR (Institut avtomatiki i telemekhaniki AN SSSR)

TITLE: Principles in the design of a non-search adaptive automatic control system with varying parameters

SOURCE: AN SSSR. Doklady, v. 170, no. 6, 1966, 1279-1282

TOPIC TAGS: automatic control theory, control system stability, self adaptive control, automatic gain control

ABSTRACT: The authors analyze a self-adaptive automatic control system in which the gain is varied over a wide range as a function of the system's stability. The gain variation is slow compared to the speed of the transient processes. The control system is described by the motion of points in an n-dimensional phase space. The authors show that the dynamic performance of the system is considerably improved, if the vector, governing the motion of the points, changes in accordance with a predetermined relation to the transient system's behavior. The transient behavior is characterized by the time interval Δt which is required for transition of a point from one fixed hyperplane

Card 1/2 UDC: 62-50

ACC NR: AP6034566

of the phase space to another. The control system realized in accordance with this concept includes a functional transformation block which controls the value of the gain coefficient in relation to the system's transient behavior. Orig. art. has: 27 formulas.

SUB CODE: 09,12/ SUBM DATE: 22Jul66/ ORIG REF: 007

Card 2/2

L 07076-67 EWT(d)/EWP(v)/EWP(k)/EWP(h)/EWP(1)

ACC NR: AP6024405 SOURCE CODE: UR/0020/66/169/001/0052/0054

AUTHOR: Petrov, B. N. (Academician); Yemel'yanov, S. V.; Gritsenko, M. B. 31

ORG: Institute of Automation and Remote Control (Institut avtomatiki i telemekhaniki) B

14

TITLE: Autonomy in multiconnected systems of automatic control with variable structure

SOURCE: AN SSSR. Doklady, v. 169, no. 1, 1966, 52-54

TOPIC TAGS: automatic control design, automatic control parameter, algorithm

ABSTRACT: The authors discuss problems related to the synthesis of the control of multiconnected plants whose internal properties determine the presence of finite or differential connections with respect to the control coordinates. The algorithm of the control device must ensure an independent motion with respect to each of the controlled quantities relative to the changes of other control coordinates, i.e., it must satisfy the autonomy condition. The autonomy problem is solved by the methods of variable structure systems. By means of such a system a multiconnected control system is established which is autonomous within a certain subspace of the coordinate phase space in such a manner that the autonomy conditions are only

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L 07076-67

ACC NR: AP6024405

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weakly sensitive to changes within a wide range of the characteristics of the object under control. Orig. art. has: 10 formulas.

SUB CODE: 13,12/ SUBM DATE: 04Apr65/ ORIG REF: 007

Card 2/2 ZC

AUTHOR: Yemel'yanov, S.V. (Moscow) 103-10-1/10

TITLE: The Way of Obtaining Complicated Laws of Control Using only an Error Signal and its First Derivative. (Sposob polucheniya slozhnykh zakonov regulirovaniya s ispol'zovaniyem lish'signala oshibki ili reguliruyemoy koordinaty i yeye pervoy proizvodnoy)

PERIODICAL: Avtomatika i Telemekhanika, 1957, Vol. 18, Nr 10, pp. 873-885 (USSR)

ABSTRACT: A method of obtaining complicated laws of control which might be necessary for the solution of stabilization problems and of obtaining high quality control is demonstrated. If a functional transformation $w(t) = \sigma^{*}(x, \dot{x})\, x(t) + \sigma(x, \dot{x})\, x(t)$ is introduced into the law of control of a linear system of automatic control, the effectiveness of this correction will remain unchanges with the various changes of the scale of the exciting action $\sigma^{*}(x, \dot{x})$, $\sigma(x, \dot{x})$ are step-functions which within certain sectors of the plane x, $\dot{x}$ assume constant values and which show "cracks" (steps) of the first order. It is demonstrated that the above functional transformation can be realized by means of a non linear corrector built up by means of a simple relay scheme. There are 16 figures and 8 Slavic references.

Card 1/2

The Way of Obtaining Complicated Laws of Control Using only an Error Signal and its First Derivatives. 103-10-1/10

SUBMITTED: January 14, 1957

AVAILABLE: Library of Congress

Card 2/2

YEMEL'YANOV, S. V. Cand Tech Sci--(diss) "Method of the stabilization and improvement of the quality ~~qualitative improvement~~ of dynamic systems by means of nonlinear corrective devices ~~installations~~ of the "key" type." Mos, 1958. 15 pp (Acad Sci USSR. Inst of Automation and Telemechanics), 100 copies (KL, 11-58, 116)

YEMEL YANOV, S.V.

(5)

PHASE I BOOK EXPLOITATION SOV/3397
SOV/11-M-112

Moscow. Aviatsionnyy institut imeni Sergo Ordzhonikidze

Nekotoryye metody rascheta sistem avtomaticheskogo regulirovaniya i ikh elementov; sbornik statey (Some Methods of Calculating Automatic Control Systems and Their Components; Collection of Articles) Leningrad, Sudpromgiz, 1959. 123 p. (Series: Its: Trudy, vyp. 112) Errata slip inserted. 8,400 copies printed.

Scientific Ed.: B.N. Petrov; Ed. (Title page): B.N. Petrov, Corresponding Member USSR Academy of Sciences, Professor; Ed. (Inside book): V.S. Chichkanova; Tech. Ed.: N.V. Krastova.

PURPOSE: This collection of articles is intended for specialists in scientific research institutes and special design bureaus and plants engaged in problems of automatic regulation. It may also be useful to students and teachers in schools of higher education.

COVERAGE: This collection of articles presents original works in the field of analysis and synthesis of nonlinear systems of automatic regulation and of linear systems with variable parameters. Some problems of calculating individual components of automatic systems are also discussed. References are listed after most of the papers.

Voronkov, B.S., Candidate of Technical Sciences. Obtaining Optimal Processes in Certain Relay Regulation Systems 39

The author defines as "optimal" the shortest aperiodical transient process (at a given amplification factor of the relay component) without overcorrection and with zero residual irregularity. He investigates a relay regulation system effected by an external disturbance. The attempts to determine the auxiliary signal necessary for obtaining optimal conditions.

Bibliography 49

Yemel'yanov, S.V., Candidate of Technical Sciences. Regulation of a Neutral Object by Using an Astatic Regulator With a Nonlinear Correction 50

The author discusses a method of regulating a neutral object by an astatic regulator with proportional velocity and nonlinear correction, which permits obtaining a system stable in the large. The regulating process would be damped in the first amplitude and the regulation time minimal for given initial disturbances and given constant equation coefficients of the object and of the regulator. Both the object and the regulator are described by equations of the first order. The author makes a qualitative investigation of such a system and reveals all possible kinds of movement occurring after arbitrary initial disturbances. He establishes relationships between parameters which determine the dynamic indices of the system.

Bibliography 105

Lebedev, A.A., Doctor of Technical Sciences. Motion Stability in the Final Time Interval 106

The author investigates disturbed motion in the final time interval by using the direct method of Lyapunov. As an example, he determines the maximum time interval in a problem presented by G.V. Kamenkov.

Bibliography 113

Kolosov, S.P., Candidate of Technical Sciences. Critical Temperature Forcing in Windings of Regulator Electrical Components 114

The author investigates this problem in the case of a d-c winding at a constant voltage, and finds an expression for the critical temperature.

Bibliography 120

Balashov, M.A., Engineer. Semiconductor Thermistors in Delay Circuits 121

The author constructed a time relay equipped with a semiconductor thermistor and supplied from an a-c network at commercial frequency. He investigates the stability of its operation with fluctuations in the voltage and determines the efficient range of time delays and of operating conditions.

AVAILABLE: Library of Congress JP/lsb

Card 7/7

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77477
SOV/103-21-1-8/22

AUTHOR: Yemel'yanov, S. V. Fedotova, A. I. (Moscow)

TITLE: Design of Optimum Automatic Control Systems of the Second Order Using Limiting Values of Gain of Control Circuit Elements

PERIODICAL: Avtomatika i telemekhanika 1960, Vol 21, Nr 1, pp 56-63 (USSR)

ABSTRACT: In the study the problem is discussed of obtaining automatic control giving the optimum transient state in linear systems of the second order, when use is made of maximum magnitudes of transfer coefficients of the system. The optimum transient process is such a process which does not have overregulation when the step unit function is applicated, and for which the time, during which the controlled coordinate is smaller than any beforehand set value, is the minimum. (1) Design of optimum transient processes of automatic regulation systems of the second order using the limiting values of transfer coefficients: Figure 1 shows the system

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Design of Optimum Automatic Control Systems of the Second Order Using Limiting Values of Gain of Control Circuit Elements

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discussed.

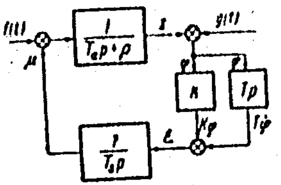

Fig. 1.

Fig. 1.

The equations of the component elements of this system are as follows: The equation of the regulated object is:

$$T_a \dot{x} + \rho x = -\mu + f(t); \quad (1)$$

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The performing mechanism's equation is:

$$T_s\dot{\mu} = \xi: \qquad (2)$$

The equation of the master arrangement is:

$$x - g(t) = \varphi; \qquad (3)$$

and the equation of the summating arrangement is:

$$\xi = K\varphi + T\dot{\varphi}.$$

Here x is relative deviation of the regulated coordinate; φ is relative change in the error signal; μ is relative deviation of the regulating device; $1/\rho$ is static transfer coefficient of the object; T_a/ρ is time constant of the regulated object; T_s is integration constant of the performing mechanism; K is gain of the amplifier of the error signal; T is coefficient of action over derivative; ξ is the output quantity of the summating device; f(t) is external perturbance; and g(t) is reference signal. Assuming f(t) = g(t) = 0 the following equation for the free oscillations of the system is obtained:

$$\ddot{\varphi} + 2h\dot{\varphi} + \omega_0^2 \varphi = 0.$$

Here

$$2h = \frac{\rho}{T_a} + \frac{T}{T_a T_s}, \quad \omega_0^2 = \frac{K}{T_a T_s}. \tag{4}$$

The phase plane analysis is made with respect to parameters K and T which can vary within the range:

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$$-K_0 \leqslant K \leqslant K_0, \quad -T_0 \leqslant T \leqslant T_0,$$

Design of Optimum Automatic Control Systems
of the Second Order Using Limiting Values
of Gain of Control Circuit Elements

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where K_0 and T_0 are limiting magnitudes of coefficients K and T, respectively. Variation of signs of coefficients K and T gives four system structures:

1) $K > 0, \quad T > 0;$
2) $K > 0, \quad T < 0;$
3) $K < 0, \quad T > 0;$
4) $K < 0, \quad T < 0.$

The equations of free oscillations are given for these four cases on the basis of previously published papers. Figure 2 shows the phase representation of the system. Figure 2a and b, correspond to the first case, Fig. 2c and d to the second, Fig. 2e to the third, and Fig. 2f corresponds to the fourth case. The succession of changes in the structure of the system must be so determined that the point of representation moves

Card 5/11

Design of Optimum Automatic Control Systems of the Second Order Using Limiting Values of Gain of Control Circuit Elements

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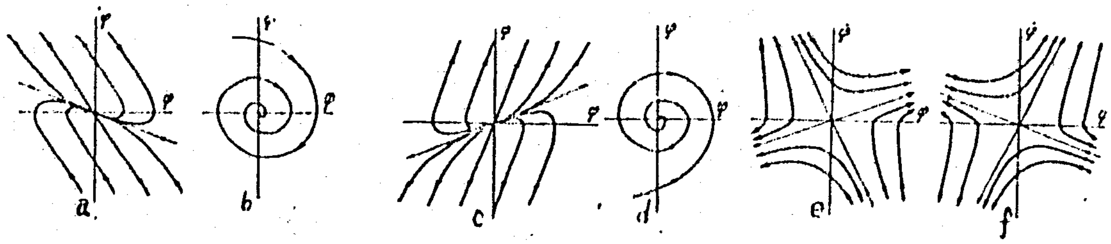

Card 6/11 Fig. 2.

Design of Optimum Automatic Control Systems of the Second Order Using Limiting Values of Gain of Control Circuit Elements

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toward the origin of coordinates in such a manner that the transfer process of the system with respect to the regulated coordinate be an optimum. The resultant phase representation of the optimum transfer performance is shown on Fig. 3. The phase representation of the optimum control system is a three-leaf phase surface. The nonlinear law of the regulation insuring such a change in the structure of the system is given in the form:

$$\xi(t) = \begin{cases} K\varphi + T\dot{\varphi} \ \text{ат} \ \varphi\dot{\varphi} \geqslant 0, \\ K\varphi - T\dot{\varphi} \ \text{ат} \ (T_j\dot{\varphi} + K_j\varphi)\dot{\varphi} < 0, \\ -K\varphi + T\dot{\varphi} \ \text{ат} \ (T_j\dot{\varphi} + K_j\varphi)\varphi \leqslant 0. \end{cases} \quad (14)$$

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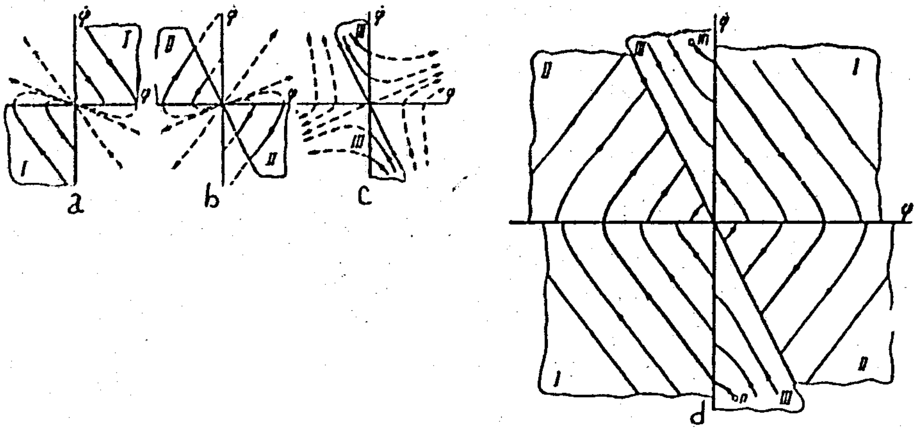

Card 8/11 Fig. 3.

Design of Optimum Automatic Control Systems of the Second Order Using Limiting Values of Gain of Control Circuit Elements

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(2) Design of the optimum law of control: From Eq. (14) it follows that the system must contain a nonlinear correcting arrangement with a switching device changing the sign of the error signal and its derivative during the transient performance, as required by their signs and correlations. This is realized by the nonlinear arrangement of the "key" type consisting of two meshes. The diagram of the correcting system is shown on Fig. 4. This diagram is taken from one of previously published papers. The first ψ_1 mesh passes the signal ϕ when $(T_J \Phi + K_J \phi) \leq 0$ and the second ψ_2 mesh passes the signal Φ when $T_J \phi + K_J \phi) \leq 0$. There are 5 figures; and 20 references, 16 Soviet, 1 German, 1 Czechoslovak, 2 U.S. The U.S. references are: Fluegge-Lotz, I., Taylor, C. F. Synthesis of a Nonlinear Control System, Trans. IRE, PG AC-1, May, 1956;

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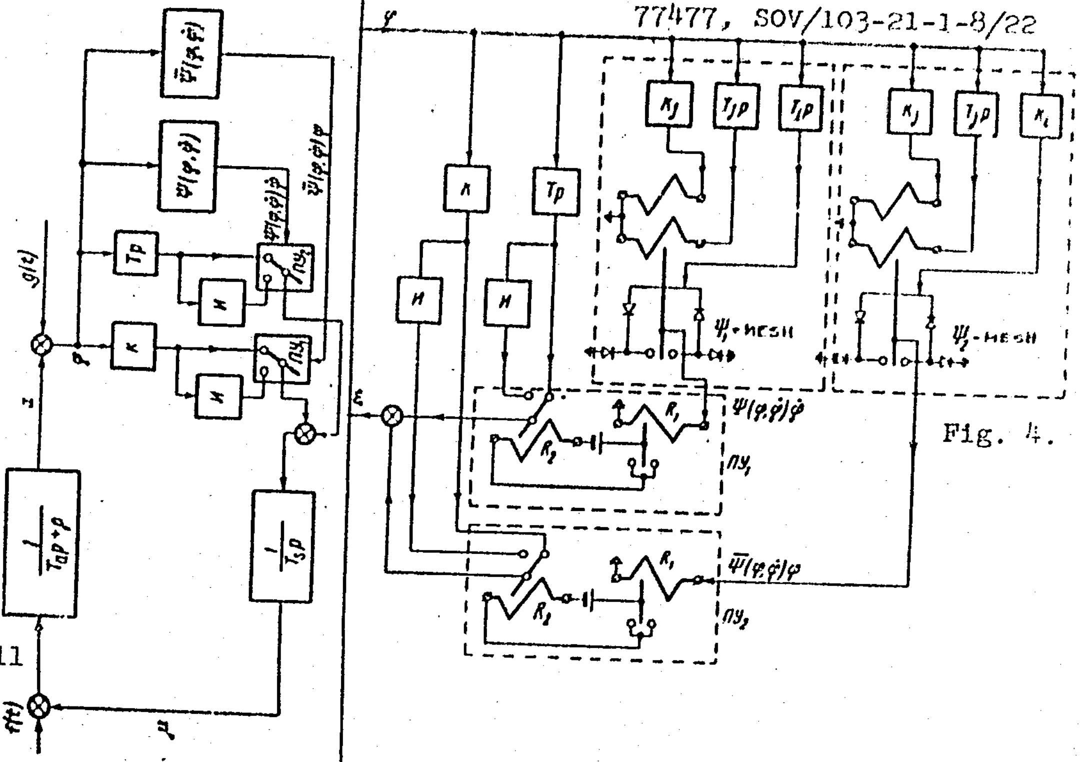

Fig. 4.

Design of Optimum Automatic Control Systems of the Second Order Using Limiting Values of Gain of Control Circuit Elements

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Fluegge-Lotz, I., Wunsch, W. S., On a Nonlinear Transfer System, Journ. Appl. Phys., Vol 26, April, 1955.

SUBMITTED: June 20, 1959

Card 11/11

S/103/60/021/008/006/014
B012/B063

AUTHORS: Burovoy, I. A., Yemel'yanov, S. V. (Moscow)

TITLE: Control of Some Continuous Manufacturing Processes by Minimum Changes of the Controlling Actions

PERIODICAL: Avtomatika i telemekhanika, 1960, Vol. 21, No. 8, pp. 1149-1157

TEXT: First, it is noted that the controllers available at present show discrepancies between technological requirements and control dynamics. It is therefore necessary to develop such automatic control systems as guarantee the necessary quality of control processes for minimum changes of the controlling actions that are required for the compensation of disturbances in static modes of operation (without measurements). This is illustrated by some examples. The resulting problem was solved by means of a new controller developed on the basis of the theory of non-linear automatic control systems of variable structure (Refs. 4 - 7). To illustrate the "synthesis" of the non-linear control law that warrants the necessary structural change of the controller, the authors studied the

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by Minimum Changes of the Controlling Actions B012/B063

simplest automatic control system which is expressed by non-linear differential equations of the second order. This system is schematically shown in Fig. 1a. The non-linear control law is "synthesized" for this system with minimum changes of the controlling action. In order to obtain this non-linear control law, the authors employed the method of the many-sheeted phase surface (Ref. 8). Thus, the problem to be solved is reduced to the phase representation of a non-linear system, which illustrates the successive structural changes. Next, the authors give the three systems of structures possible for a given structure of the object and in the absence of other actions in the control law. It is shown that the equation of a controller warranting the necessary structural change during the transient must have the form of formula (9). The properties of the resultant non-linear system are compared with those of the linear control system that is based on the [illegible] -130 (IR-130) controller. The maximum value of the dynamic error is used for comparison. Formulas (11) and (12) are written down for the determination of this value for linear and non-linear systems, respectively. This comparison indicates that, contrary

Control of Some Continuous Manufacturing Processes by Minimum Changes of the Controlling Actions

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to linear systems, a rather small error can be obtained for the system with a non-linear correction. This is due to a quicker action of the controller. It proved to be suitable to construct non-linear controllers of variable structure and to exclude the function derived and the linearizing elements of the switching mechanism. Fig. 3 shows the circuit diagram and Fig. 4 a photograph of such a controller. The latter consists of logical operation circuit with an integral member of constant velocity. If this member is combined with six relay elements, it warrants the necessary structural change during the transient. Besides, the controller has an integral switching mechanism of constant velocity. The controller described has already been tested industrially, and is at present being tested in operation. M. S. Lodyseva and O. P. Zelentsov assisted in this work. It is finally noted that the theoretical study of the final construction of this non-linear controller of variable structure will be described individually. There are 4 figures and 8 references: 7 Soviet and 1 Australian.

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Control of Some Continuous Manufacturing Processes by Minimum Changes of the Controlling Actions

S/103/60/021/008/006/014
B012/B063

SUBMITTED: July 14, 1959

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S/103/62/023/010/002/008
D201/D308

16.6000

AUTHORS: Yemel'yanov, S. V. and Fedotova, A. I. (Moscow)

TITLE: Synthesis of zero position error in follow-up systems with variable structure

PERIODICAL: Avtomatika i telemekhanika, v. 23, no. 10, 1962, 1298-1312

1/B

TEXT: The authors attempt to synthesize a follow-up system reproducing without position error, any control action described by continuous (also transcendental) functions containing a single integrating unit and satisfying the condition that, within a wide range of command functions g(t), the law of control remains unchanged. The principle of automatic control systems with variable structure is applied. The control functions g(t) analyzed are of the type $g(t) = \beta$ and $g(t) = \alpha t$, at which the performance factors of transients remain constant. The analysis results in a nonlinear element in the follow-up system forming the logical function of the control law in various ways by means of typical logical elements. One possible

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Synthesis of zero ...

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D201/D308

version consists of one polarized relay, two groups of diodes, two differentiating networks and two potentiometers. There are 8 figures.

SUBMITTED: February 27, 1962

Card 2/2

16,8000

S/024/62/000/003/009/011
E140/E463

AUTHORS: Yemel'yanov, S.V., Taran, V.A. (Moscow)

TITLE: On a class of automatic control systems with variable structure

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye tekhnicheskikh nauk. Energetika i avtomatika, no.3, 1962, 183-188

B

TEXT: The author refers to A.M.Letov's demonstation (Avtomatika i telemekhanika, v.18, no.7, 1957) that the quality of an automatic control system can be improved substantially by change of sign of the controller velocity at a certain instant of time chosen so that the generating point in the phase space finds itself on a certain hyperplane, with absence of motion corresponding to a real positive root. Unfortunately present technical possibilities do not permit such systems to be realized and inexactness in determining the instant of switching leads to instability. The author seeks a similar system, having the advantages of conditionally stable systems, without their disadvantages. It is necessary to select a switching hyperplane
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S/024/62/000/003/009/011
E140/E463

On a class of automatic ...

1/B

such that it pass through the origin of coordinates, be sufficiently close to the Letov hyperplane and with the phase velocity vectors in its vicinity everywhere directed towards it. Then the generating point will move in slipping mode on the hyperplane and with small deviations away from it will always return to it. In such cases the quality of transient processes will be almost that of the conditionally stable system without the need for exact incidence of the generating point on the hyperplane. The author considers successively stability over the entire hyperplane and the conditions of incidence on the hyperplane for arbitrary initial conditions.

SUBMITTED: March 20, 1962

Card 2/2

YEMEL'YANOV, S.V. (Moskva)

High-quality control of some nonlinear objects with variable parameters. Izv. AN SSSR. Otd. tekh. nauk. Energ. i avtom. no.4:122-129 Jl-Ag '62. (MIRA 15:8)

(Automatic control)

16.8000

S/020/62/145/004/007/024
B112/B102

AUTHORS: Yemel'yanov, S. V., and Bermant, M. A.

TITLE: Design of high-quality automatic control systems for objects with variable parameters

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 145, no. 4, 1962, 748 - 751

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TEXT: The system of differential equations $d\vec{x}/dt = \vec{f}(\vec{x})$, where $\vec{x} = (x_1,\dots,x_n)$; $\vec{f} = (f_1,\dots,f_n)$; $f_i = x_{i+1}$ $(i = 1,2,\dots,n-1)$; $f_n = \sum_{i=1}^{n} \psi_i(\vec{x})x_i$; $\psi_i(\vec{x}) = a$; for $\sum_{j=1}^{n} c_j x_j > 0$, $\psi_i(\vec{x}) = b_i$ for $\sum_{j=1}^{n} c_j x_j < 0$ $(i = 1,2,\dots,n)$, is solved in such a way that the solutions depend on the object parameters a_i and b_i only outside a certain region U. A second-order system is considered as an example. There are 3 figures.

ASSOCIATION: Institut avtomatiki i telemekhaniki (Institute of Automation and Telemechanics)

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S/020/62/145/004/007/024
B112/B102

Design of high-quality automatic ...

PRESENTED: March 14, 1962, by B. N. Petrov, Academician

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SUBMITTED: March 12, 1962

Card 2/2

PETROV, B. N.; ULANOV, G. M.; YEMEL'YANOV, S. V.

"Invariancy and Optimization in Automatic Systems with Nonflexible and Variable Structure."

Paper to be pr3sented at the IFAC Congress held in Basel, Switaerland, 27 Aug to 4 Sep 63

S/103/63/024/001/003/012
D201/D308

9.3280

AUTHORS: Yemel'yanov, S. V. and Taran, V. A. (Moscow)

TITLE: Lag networks in the design of a class of automatic control systems with variable structure. I

PERIODICAL: Avtomatika i telemekhanika, v. 24, no. 1, 1963, 33-46

TEXT: The authors show, on the example of control of a neutral object by means of a regulator with zero position error, that the system can be stabilized by replacing the differentiating units by lag networks: they also analyze such a system by representing its motion in a three-dimensional phase space x, $\dot{x}$, θ and by its projections on planes $x\dot{x}$ and xθ (where θ is the signal at the input of the lag network). In the system analyzed the switching network (ψ - network) is that suggested by S. V. Yemel'yanov (Avtomatika i telemekhanika, v. 20, no. 7, 1959). The theoretical analysis of the motion for arbitrary initial conditions makes it possible to determine the parameters of the lag network as dependent on the parameters of the system. The analysis of the motion in the three-

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D201/D308

Lag networks in ...

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dimensional phase space allows further recalculation of the lag network parameters if optimum transient is to be achieved. There are 11 figures.

SUBMITTED: April 23, 1962

Card 2/2

S/280/63/000/001/016/016
E140/E435

AUTHORS: Yemel'yanov, S.V., Taran, V.A. (Moscow)

TITLE: A method for stabilizing automatic control systems with alternating (variable) structure without use of the error signal derivatives

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye tekhnicheskikh nauk. Tekhnicheskaya kibernetika. no.1, 1963, 155-171

TEXT: The systems studied have two different corrective filters depending on the sign of the error signal. The system studied in the present note is of second order and it is shown that the use of switched inertial linear filters gives results similar in quality to those obtained with other types of structure variation, without use of the first derivative of the error signal in the control function. Relations are obtained for the establishment of the filter parameters. If the filter time constant is reduced the system dynamics are improved but the switching system must be more sensitive. The system can realize transients without overshoot or with a single overshoot. The range of initial

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L 4696-63 S/280/63/000/001/016/016
A method for stabilizing ... E140/E435 0

conditions for which no overshoot occurs can be as great as in systems with derivative control. There are 9 figures.

SUBMITTED: June 12, 1962

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Card 2/2

S/103/63/024/002/008/020
D201/D308

16.8000

AUTHORS: Yemel'yanov, S.V. and Taran, V.A. (Moscow)

TITLE: Application of lag elements to the design of a class of variable structure regulators. II

PERIODICAL: Avtomatika i telemekhanika, v. 24, no. 2, 1963, 193-201

TEXT: The authors consider: 1) the choice of parameters of the lag element producing not more than one overshoot at any initial conditions, 2) the possibility of extending the range of initial conditions with no overshoot in the system, and 3) the monotonicity of the transient. Conclusions: 1) In designing automatic regulators of variable structure it is possible to use the error signal as transformed by either a lag or a lagless element. The parameters of the lag element have to satisfy certain conditions derived in part I and II of the work. 2) A decrease of the time constant of the lag element imposes the system dynamics but requires a more sensitive switching arrangement. 3) It is possible, depending on initial conditions

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Application of lag elements ...

to design a system either with a monotonic transient or with one overshoot only. The range of initial conditions for which the response has no overshoots may be extended if the switching is controlled either by the error itself or by its derivative. All results were checked on ИПТ-5 (IPT-5) analog computer and proved to be in agreement with the theoretical analysis. There are 5 figures and 1 table.

SUBMITTED: May 26, 1962

Card 2/2

YEMEL'YANOV, S.V. (Moskva); TARAN, V.A. (Moskva)

Addition to E.I. Gerashchenko's article. Izv. AN SSSR. Tekh. kib. no.4:164 Jl-Ag '63. (MIRA 16:11)

YEMEL'YANOV, S.V. (Moskva); TARAN, V.A. (Moskva)

Use of commutating phase-shifting filters in an automatic control system with variable structure. Izv. AN SSSR. Tekh. kib. no.5:164-170 S-O '63. (MIRA 16:12)

L 9889-63 BDS
ACCESSION NR: AP3000465 S/0103/63/024/005/0615/0627

AUTHOR: Bermant, M. A.; Yemel'yanov, S. V. 46

TITLE: Method for controlling a certain class of variable-parameter systems

SOURCE: Avtomatika i telemekhnika, v. 24, no. 5, 1963, 615-627

TOPIC TAGS: variable-structure controlled systems, automatic control systems

ABSTRACT: In many cases the controlled-system parameters vary over a wide range. An automatic-control system that permits unlimited increase in the amplification factor of an open-loop system can be used in such cases. For closed-loop systems, similar conditions arise under a "sliding regime", instead of the unlimited a. f. The sliding regime can occur, with certain limitations, in any dynamic system that can be described by a set of differential equations having discontinuous right-hand members. Specifically, it can occur in "variable-structure" systems. The above differential equations are analyzed in the article. Controlling the variable-parameter neutral system by means of a floating-action controller is considered in detail. A numerical example is presented. Orig. art. has: 57 equations and 10 figures.

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YEMEL'YANOV, S.V.; UTKIN, V.I.

Use of automatic regulation systems of variable structure for controlling objects whose parameters vary within a wide range. Dokl. AN SSSR 152 no.2:299-301 S '63. (MIRA 16:11)

1. Institut avtomatiki i telemekhaniki AN SSSR. Predstavleno akademikom B.N. Petrovym.

YEMEL'YANOV, S.V.; KOSTYLEVA, N.Ye.

Some characteristics of motion in automatic control systems of variable structure with a discontinuous switching function. Dokl. AN SSSR 153 no.4:776-778 D '63. (MIRA 17:1)

1. Institut avtomatiki i telemekhaniki AN SSSR. Predstavleno akademikom B.N. Petrovym.

ACCESSION NR: AP4006481 S/0020/63/153/005/1020/1023

AUTHORS: Petrov, B. N. (Academician); Yemel'yanov, S. V.

TITLE: The principle of constructing combined automatic control systems with variable structure

SOURCE: AN SSSR. Doklady*, v. 153, no. 5, 1963, 1020-1023

TOPIC TAGS: combined servo system, servo system, variable structure, control system, control response reproduction accuracy, linear nonhomogeneous differential equation, static reproduction, dynamic reproduction, open loop structure, closed loop structure, variable structure servo

ABSTRACT: Combined servos are used in many cases in order to improve the static and dynamic fidelity of reproduction of the manipulated variable. The transient responses in such systems can be described by a linear nonhomogeneous differential equation $M(p)x=N(p)g(t)$ where $M(p)$ and $N(p)$ are operator polynomials with respect to (p); $p \equiv d/dt$; x is the error signal; and $g(t)$ is the manipulated variable, being a continuous time function. Independence of the error signal

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ACCESSION NR: AP4006481

x from the manipulated variable $g(t)$ is generally determined by the condition $N(p)=0$. In this case, the forced component $x_{forced}(t)$ for the general solution of equation (1) is identically equal to zero. In a general case, the following are required to satisfy equation (2): (i) differentiation of the manipulated variable; (ii) invariability of the parameters for the open and closed loops of the combined sews system. Authors attempt to solve this problem, not attempting to fulfill the conditions of (2) and by weakening the above limitations (i) and (ii). Authors constructed a combined servo system in such a way that when the closed and open loop parameters are changed in sufficiently wide limits and various functions of the manipulated variable $g(t)$, (i) a domain U would exist which would contain the origin of the coordinates anc the solution of the system of differential equations $dx/dt=f^{0}(x)$ would satisfy the given requirements with respect to quality of control process (control period and maximum dynamic error should not transcend certain given values); (ii) under any initial conditions the solution of the system of equations $dx/dt= f(x,g(t))$ would fall in the domain U, wherein the coordinate x, would change sign not more than once; (iii) there would not exist

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ACCESSION NR: AP4006481

any trajectories in the domain U which would serve as segments of limit cycles with partially sliding regime. Then the solution of the initial system of differential equations $dx/dt = f(x, g(t))$ will depend upon the controlling disturbance and parameters of the closed and open loops only up to the moment when $x(t)$ falls into the domain U, where the solution coincides with the solution of the system of homogeneous differential equations $dx/dt = f^0(x)$. Because the transient response terminates in the domain U, the combined servo system reproduces a wide class of manipulated variables $g(t)$ without static errors, and, inasmuch as the solution in U depends only upon the coefficients cj, the influence of the closed and open loop parameters upon the quality of the control process will essentially weaken. Orig. art. has: 4 Figures and 10 Equations.

ASSOCIATION: Akademiya nauk SSSR (Academy of sciences SSSR)

SUBMITTED: 30Jul63 DATE ACQ: 09Jan64 ENCL: 00

SUB CODE: CG NR REF SOV: 001 OTHER: 000

Card 3/3

PETROV, B.N., akademik; YEMEL'YANOV, S.V.; DUDIN, Ye.B.

Selection of criteria for the synthesis of combination servosystems of variable structure. Dokl. AN SSSR 153 no.6: 1280-1283 D '63. (MIRA 17:1)

ACCESSION NR: AP4015306

a_i, b_i are constant coefficients, $a_1 \neq 0$, $b_{n+1} = 1$, $n > m$, p^* is a generalized-derivative operator, x_1 is the controlled variable, and ψ is the discontinuous function of the system of coordinates. By introducing a new system of coordinates connected with the initial system by certain operators, phase trajectories are made continuous. A control law is developed under which the switching hyperplane, in this new space, occupies a fixed position. Conditions for the existence of a sliding mode in the entire switching hyperplane are deduced. Orig. art. has: 19 formulas.

ASSOCIATION: none

SUBMITTED: 28Jul63 DATE ACQ: 12Mar64 ENCL: 00

SUB CODE: CG, IE NO REF SOV: 003 OTHER: 000

ACCESSION NR: AP4015306 S/0280/64/000/001/0182/0186

AUTHOR: Yemel'yanov, S. V. (Moscow); Kosty*leva, N. Ye. (Moscow)

TITLE: Synthesizing variable-structure automatic-control systems having a discontinuous switching function

SOURCE: AN SSSR. Izvestiya. Tekhnicheskaya kibernetika, no. 1, 1964, 182-186

TOPIC TAGS: automatic control, automatic control synthesis, variable structure automatic control, switching function, discontinuous switching function, transfer function with zeros, discontinuous automatic control

ABSTRACT: A variable-structure automatic-control system is considered which can be described by this equation:

$$Q(p^*)x_1 = P(p^*)(-\psi x_1),$$

where $Q(p^*) = \sum_{i=0}^{n} b_{i+1} p^{*i}$, $P(p^*) = \sum_{i=0}^{m-1} a_{i+1} p^{*i}$,

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ACCESSION NR: AP4028985 S/0280/64/000/002/0140/0142

AUTHOR: Yemel'yanov, S. V. (Moscow); Utkin, V. I. (Moscow)

TITLE: Stability of one class of variable-structure automatic-control systems

SOURCE: AN SSSR. Izvestiya. Tekhnicheskaya kibernetika, no. 2, 1964, 140-142

TOPIC TAGS: automatic control, variable structure automatic control, automatic control stability, automatic control theory

ABSTRACT: The theoretical proof is offered that, in a variable-structure automatic-control system of the n-th order having a high enough open-loop gain, any motion will be under sliding conditions from a certain moment of time. The theorem is proven that, with a sufficient gain, the state point in the space X, from any initial position, over a finite time interval, will reach the hyperplane S. Hence, the automatic-control system will be stable. Orig. art. has: 8 formulas.

ASSOCIATION: none

SUBMITTED: 25Oct63 DATE ACQ: 30Apr64 ENCL: 00

SUB CODE: IE NO REF SOV: 003 OTHER: 000

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[illegible]

variable structure feedback systems", the author derives and solves the ap-

SOURCE: Moscow. Gosudarstvennyy institut tsvetnykh metallov. Sbornik nauchnykh trudov, no. 21, 1964. Matematicheskiye modeli tekhnologicheskikh protsessov i razrabotka sistem avtomaticheskogo regulirovaniya s peremennoy strukturoy (Mathematical models of technological processes and development of variable structure [illegible] these coordinates as K changes [illegible]

[illegible] constant. Orig. art. has: 10 equations and 9 figures.

ACCESSION NR: [illegible]

[illegible] by the velocity of the surface [illegible] the static gain coefficient K and the derivative reaction coefficient T_{μ} can have different magnitudes and signs, depending upon the structure of the regulator. The system has five singularities, three of which are located on the x-axis (O [illegible]

[illegible]

[illegible] coefficient [illegible] initial conditions and [illegible] figures

[illegible] metallov, Moscow State [illegible]

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